Use of Recycled Materials in Construction

Citation of Law or Resolution:	136-28.8
Section Number:	(g)
Due Date:	1 Dec 2011
Submission Date:	21 Nov 2011

Receiving Entities:
Joint Legislative Transportation Oversight Committee

Submitting Entity:
Department of Transportation

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

Recycling and Solid Waste Management Report For Highway Construction and Maintenance Projects State Fiscal Year 2010 – 2011

This report is a summary of the recycling and solid waste management efforts on highway construction and maintenance projects within the North Carolina Department of Transportation for fiscal year 2011 (July 1, 2010 - June 30, 2011) as required by G.S. 136-28.8(g). This statute mandates the Department prepare an annual report on the amounts and types of recycled materials specified or used in construction and maintenance operations during the previous fiscal year. The types of recycled materials incorporated into the projects noted would normally contribute to the consumer and industrial waste streams, compounding the problem of declining space in landfills.

Efforts to utilize recycled and solid waste materials are in response to the requirements of G.S 136-28.8(b) which mandates the Department to use recycled materials in highway projects, specifically:

(1) Rubber from tires for pavements, subbase materials, and other appropriate applications.
(2) Recycled materials for guardrail posts, right of way fence posts, and sign supports.
(3) Recycling technology including but not limited to hot in-place recycling on roads in highway maintenance.

All applications of recycled materials are to be consistent with economic feasibility and applicable engineering and environmental quality standards.

Highway Construction and Maintenance Projects

Specifications now require that many of the products used in highway construction projects, such as guardrail offset blocks and flexible delineator posts, be manufactured from some quantity of recycled materials. Glass beads used for retroreflective pavement markings are manufactured from 100% recycled glass. Reclaimed asphalt pavement (RAP) may constitute up to 50% of the total material used in most recycled mixtures, and RAP mixtures are used on a majority of projects. Fly ash is sometimes used as a concrete component for up to 20% by weight of the required cement content. Some of the notable recycled or solid waste materials utilized this fiscal year are denoted on the following page.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
QUALITY ENHANCEMENT UNIT
1502 MAIL SERVICE CENTER
RALEIGH NC 27699-1502

TELEPHONE: 919-508-1867
FAX: 919-508-1954
WWW.NCDOT.GOV

LOCATION:
RANEY BUILDING
104 FAYETTEVILLE STREET MALL
RALEIGH, NC 27601

Recycling and Solid Waste Management Report
For Highway Construction and Maintenance Projects
State Fiscal Year 2010 – 2011

1. Over 745,000 tons of Reclaimed Asphalt Pavement (RAP) were used as an asphalt mix additive.
2. About 15,000 cubic yards of clearing and grubbing debris were used as mulch for erosion control and roadside environmental applications.
3. Over 18,000 tons of coal combustion fly ash were used in concrete mixes.
4. Approximately 4,400 tons of recycled glass beads were used in pavement marking.
5. Maintenance personnel across the state continue to reuse products including:

- Aggregate Base Course
- Concrete pipe
- Guardrail
- Signs and posts
- Steel Beams

See Attachment 1 for quantities of recycled and solid waste materials used during the 2010 – 2011 state fiscal year. Attachment 2 summarizes total quantities, as well as a rolling average since 1989.

Website

For up-to-date information on NCDOT's use of recycled materials, visit:

http://www.ncdot.org/doh/preconstruct/altern/value/recycle/default.html

Attachment 1

North Carolina Department of Transportation
Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects
Summary, July 2010 through June 2011

Product Category and Description	Usage	Quantity for SFY 2010-2011	Unit of Measure
1-Asphalt:			
Reclaimed Asphalt Pavement (RAP)	Asphalt Mix Additive	745,647	Tons
Reclaimed Asphalt Pavement (RAP)	Aggregate Base Course (ABC)	5,369	Tons
Reclaimed Asphalt Pavement (RAP)	Shoulder Reconstruction	33,788	Cubic Yards
Reclaimed Asphalt Shingles (RAS)	Asphalt Mix Additive	0	Tons
Hot-In-Place Asphalt Recycling	Pavement	782,000	Square Yards
Full-Depth Reclamation	Pavement	15,850	Cubic Yards
2-Clearing and Grubbing Debris:			
Mulch	Mulch	104	Acres
Mulch	Mulch - Roadside Environmental	13,530	Cubic Yards
Mulch	Erosion Control	1,575	Cubic Yards
3-Coal Combustion Products:			
Fly Ash	Concrete Mix Additive	18,189	Tons
Fly Ash	Embankment Fill	0	Cubic Yards
Fly Ash	Flowable Fill	89	Cubic Yards
Fly Ash	Asphalt Mix Additive	0	Tons
Bottom Ash	Embankment Fill	0	Cubic Yards
4-Concrete:			
Recycled Concrete	Aggregate Base Course (ABC)	0	Tons
Recycled Concrete	Fill Material	466	Tons
Crack and Seat	Base Material	0	Tons
Rubblized Concrete	Base Material	0	Tons
5-Glass:			
Recycled Glass Beads	Pavement Markings	4,396	Tons
Crushed Glass	Subdrain Backfill	0	Tons
Crushed Glass	Pipe Foundation	0	Tons
Crushed Glass	Aggregate Base	0	Tons
6-Plastic:			
Recycled Plastic Offset Blocks	Guardrail Offset Blocks	2,632,675	Each
Recycled Plastic Fence Posts (All Sizes)	Fence Posts	200	Each
Recycled Plastic Pipe (All Types and Sizes)	Pipe	0	Linear Feet
Recycled Plastic Flexible Delineators	Flexible Delineator Posts	0	Each
Recycled Plastic Barricades	Type III Barricades	0	Feet
Recycled Plastic Traffic Separators	Railroad Safety Device	0	Linear Feet
7-Scrap Tires:			
Chipped Tires	Embankment Fill	0	Tires
Chipped Tires	Lightweight Aggregate	0	Tires
Chipped Tires	Sound Wall Panels	0	Tires
Crumb Rubber	Crack Sealant	38,860	Tires
Crumb Rubber	Soil Amendment	0	Tires
Crumb Rubber	Asphalt Mix Additive	31,930	Tires
Rubber Mulch	Mulch	0	Tires
Tire Sidewalls	Traffic Drum Ballast	3,885	Tires
Whole Tires	Retaining Wall	491	Tires
Total Waste Scrap Tires		0	Tires
8-Roadside Environmental:			
Advanced Alkaline Sludge	Soil Amendment	0	Tons
Aged Leaf Mold & Yard Debris	Soil Amendment	0	Tons
Ammonium Sulfate Liquid	Fertilizer/Soil Amendment	0	Gallons
Bark Mulch	Soil Amendment	0	Tons
Bioremediated Petroleum Affected Soils	Soil Amendment	0	Cubic Yards
Cotton Gin Waste	Soil Amendment	0	Cubic Yards

Attachment 1

North Carolina Department of Transportation
Recycled Products & Solid Waste Utilization in Construction & Maintenance Projects
Summary, July 2010 through June 2011

Product Category and Description	Usage	Quantity for SFY 2010-2011	Unit of Measure
Hog Waste Compost	Fertilizer/Soil Amendment	3	Cubic Yards
Hurricane Fran Mulch	Soil Amendment	0	Cubic Yards
Hydromulch	Mulch	0	Pounds
Lime-Stabilized Municipal Sludge	Soil Amendment	0	Tons
Municipal Sludge	Soil Amendment	0	Tons
Poultry Litter	Fertilizer/Soil Amendment	3	Tons
Soil Derived from Demolition Debris	Soil Amendment	0	Tons
Compost Material (Ref: AASHTO MP-10)	Compost Blanket	79,000	Cubic Yards
9-Other:			
Steel Slag	Base Aggregate	0	Tons
Processed Silica	Embankment Fill	0	Cubic Yards
Recycled Polyester Resin	Weedmat	0	Square Yards
Recycled Bridge Items	Decking & Beams (wood)	0	Linear foot/lft
Reclaimed Asphalt Pavement (RAP)	Patching	0	Tons
Used Unclassified Structure	Borrow	0	Cubic Yards
Mabey Bridge	Bridge	0	Each
Drainage Ditch Excavation	Borrow	0	Cubic Yards
Corrugated Metal Pipe	Metal Pipe	0	Linear foot/lft
Erosion Control Stone 'B'	Slope Protection	0	Tons
White Roofing Rock	Mulch, Ditch Liner	0	Cubic Yards
Aluminum	Traffic Signal Cabinets	15	Each/ea
Cardboard	Cardboard Boxes	100	Pound/lb
Aphalt Millings	Shoulder Repair	175	Tons
Woven Wire	Fence Reset	246	Linear foot/lft
Orange PVC Safety Fence	Environmental Sensitive Delineation	623	Linear foot/lft
10-Reused Materials:			
Aggregate Base Course	Aggregate Base Course	10,713	Tons
Concrete Pipe	Concrete Pipe	2,481	Linear Feet
Guardrail	Guardrail	49,355	Linear Feet
Refurbished Traffic Signal Heads	Traffic Signal Heads	0	Each
Sign Posts	Sign Posts	40,545	Each
Signal Heads	Signal Heads	65	Each
Signs	Signs	970	Each
Silt Fence and Posts	Silt Fence and Posts	0	Linear Feet
Steel Beams	Steel Beams	2,880	Pounds
Double Faced Concrete Barrier	Concrete Barrier	0	Linear Feet
Wooden Breakaway Posts	Guardrail Offset Blocks	0	Each
40' Signal Pole (wood)	Signal Pole Replacement	0	Each
LED Signal Lamps	Signal Repair	0	Each
Signal Cabinet	Signal Repair	0	Each
1" Rigid Pipe	Signal Repair	0	Linear Feet
Portable Concrete Barrier	Portable Concrete Barrier	44,244	Each
Timber Bridge Deck/Rail	Bridge Deck/Rail	4,200	Linear Feet
Wood Pallets	Wood Pallets	400	Each